

**UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
COTTON PROGRAM**

**COTTON
CLASSIFICATION**

UNDERSTANDING THE DATA

April 2005

USDA, AMS, COTTON PROGRAM

UNIVERSAL CLASSIFICATION DATA FORMAT

(Applicable to All Methods of Data Dissemination for
Form 1 Classification Offered by the Cotton Program)

<u>FIELD NAME</u>	<u>COLUMN</u>
Gin Code Number	01-05
Gin Bale Number	06-12
Date Classed	13-20
Module, Trailer, or Single Bale	21
Module/Trailer Number	22-26
Bales in Module/Trailer	27-28
Official Color Grade	29-30
Fiber Staple Length (32 ^{nds} of an inch)	31-32
Micronaire	33-34
Strength (grams/tex)	35-37
Leaf Grade	38
Extraneous Matter	39-40
Remarks	41-42
Instrument Color Grade	43-44
Color Quadrant	45
Color Rd	46-48
Color +b	49-51
Non-Lint Content (Trash Percent Surface)	52-53
Fiber Length (100 ^{ths} of an inch)	54-56
Length Uniformity Index (percent)	57-59
Upland or Pima	60
Record Type	61
Record Status	62
CCC Loan Premiums and Discounts	63-67

The classification system for Upland cotton consists of classer leaf grade and extraneous matter (if any) and instrument measurements for color grade, fiber length, micronaire, strength, length uniformity index, color Rd, color +b, and trash percent area. All instrument measurements currently utilized in USDA Upland cotton classification are from Uster High Volume Instrument (HVI)* systems.

Classification for Pima cotton consists of classer color and leaf grades, extraneous matter (if any), and instrument measurements for color grade (unofficial), fiber length, micronaire, strength, length uniformity index, color Rd, color +b, and trash percent area. As in Upland cotton classification, all instrument measurements currently utilized in USDA Pima cotton classification are from Uster High Volume Instrument (HVI)* systems.

Most classification data is provided to the industry by use of telecommunications through direct modem or internet connections. In order to provide classification data for individual bales, the incoming bale identification tag must meet certain requirements that are discussed below. For ease of explanation, the Universal Classification Data Format is used as an example for explaining the various quality measurements.

*High Volume Instrument (HVI) is patented by Uster Technologies.

Gin Code Number (Columns 1-5)

The gin code number is composed of five digits. The first two digits denote the Classing Office, and the last three digits identify the gin. The local Classing Office assigns this code number and can provide codes for any gin.

Gin Bale Number (Columns 6-12)

The seven-digit bale numbers are assigned by the gin. A bar-coded bale identification tag, preprinted with the gin code number and gin bale number, is placed between the two halves of the sample for identification purposes. This is a Permanent Bale Identification (PBI) tag, which gives each bale a unique 12-digit number that is not repeated within a five year period. The Classing Office scans the bar codes to enter the bale identification into its computer prior to classing the sample.

Date Classed (Columns 13-20)

This is the date the bale was classed in the Classing Office. The format is YYYYMMDD.

Module, Trailer, or Single Bale (Column 21)

This one-digit code indicates whether the sample was outturned as a single bale or as a bale that was module/trailer averaged.

Single bale	=	0
Module	=	1
Trailer	=	2

Detailed information on Module Averaging is shown on pages 9-10.

Module/Trailer Number (Columns 22-26)

A five-digit number identifies the module/trailer number assigned at the gin.

Bales in Module/Trailer (Columns 27-28)

A two-digit number identifies the number of bales in the module/trailer that were released with the module average calculation.

Official Color Grade (Columns 29-30)

The official Upland color grade that appears on the classification record is determined by instrument based measurements. Color refers to the gradations of grayness and yellowness in the cotton. The official Pima color grade that appears on the classification record is determined by a human classer. Certain special condition codes listed below on this page are shown in the color grade columns for Upland and Pima. Codes that identify extraneous matter and other special condition cotton are shown in the extraneous matter and remarks section as shown on Page 6. The codes that identify American Upland and American Pima color grades are as follows:

Upland Color Grades	Pima Color Grades
11, 21, 31, 41, 51, 61, 71, 81	1, 2, 3, 4, 5, 6, 7
12, 22, 32, 42, 52, 62, 82	
13, 23, 33, 43, 53, 63, 83	
24, 34, 44, 54, 84	
25, 35, 85	

Special Condition Codes for Upland Cotton	
96	Mixture of Upland and Pima
97	Fire Damaged
98	Water Damaged

Special Condition Codes for Pima Cotton	
93	Mixture of Pima and Upland
94	Fire Damaged
95	Water Damaged

Fiber Staple Length – (32nds of an inch) (Columns 31-32); **(100ths of an inch)** (Columns 54-56)

Classification instruments measure length in hundredths of an inch. Length is reported on the classification record in both 32nds and 100ths of an inch. Length measurements are converted to 32nds of an inch as shown below:

Upland Length Conversion Chart			
Length (32nds)	Length (Inches)	Length (32nds)	Length (Inches)
24	0.79 & shorter	36	1.11 – 1.13
26	0.80 – 0.85	37	1.14 – 1.17
28	0.86 – 0.89	38	1.18 – 1.20
29	0.90 – 0.92	39	1.21 – 1.23
30	0.93 – 0.95	40	1.24 – 1.26
31	0.96 – 0.98	41	1.27 – 1.29
32	0.99 – 1.01	42	1.30 – 1.32
33	1.02 – 1.04	43	1.33 – 1.35
34	1.05 – 1.07	44 & +	1.36 & +
35	1.08 – 1.10		

American Pima Length Conversion Chart	
Length (32nds)	Length (Inches)
40	1.20 and lower
42	1.21 – 1.25
44	1.26 – 1.31
46	1.32 – 1.36
48	1.37 – 1.42
50	1.43 – 1.47
52	1.48 & +

Micronaire (Columns 33-34)

Cotton's resistance to air flow per unit mass is measured to determine micronaire. Micronaire is a measure of the cotton's fineness. Micronaire and maturity are highly correlated within a cotton variety.

Strength (grams/tex) (Columns 35-37, Decimal not displayed)

The fiber strength measurement is made by clamping and breaking a bundle of fibers with a 1/8-inch spacing between the clamp jaws. Results are reported in terms of grams per tex to the nearest tenth. A tex unit is equal to the weight in grams of 1,000 meters of fiber. Therefore, the strength reported is the force in grams required to break a bundle of fibers one tex unit in size. The following table shows some general descriptions of strength measurements in grams per tex.

<u>Fiber Strength Table</u>	
Descriptive Designation	Strength (grams per tex)
Weak	23.0 & below
Intermediate	24.0 – 25.0
Average	26.0 – 28.0
Strong	29.0 – 30.0
Very Strong	31.0 & above

Leaf Grade (Column 38)

Leaf refers to small particles of the cotton plant's leaf which remain in the lint after the ginning process. Upland leaf grades are determined by the classer and are identified as numbers 1 through 7, all represented by physical standards. Upland leaf grade 8 (Below Grade) is used to identify samples having more leaf than leaf grade 7. American Pima leaf grades are also determined by the classer and are identified as numbers 1 through 6, all represented by physical standards, and leaf grade 7 (Below Grade), which is used to describe samples having more leaf than leaf grade 6.

Extraneous Matter (Columns 39-40)

Extraneous matter is any substance in the cotton other than fiber or leaf. Examples of extraneous matter are bark, grass, spindle twist, seed coat fragments, dust, and oil. The kind of extraneous matter, and an indication of the amount (light or heavy), are noted by the classer on the classification record. The amount of extraneous matter in the cotton is reported as level 1 or level 2, with level 2 indicating the heavier contamination. The code numbers identifying the presence and level of extraneous matter in a sample are as follows:

Extraneous Matter	
01	Prep Level 1
02	Prep Level 2
11	Bark Level 1
12	Bark Level 2
21	Grass Level 1
22	Grass Level 2
31	Seed Coat Fragments Level 1
32	Seed Coat Fragments Level 2
41	Oil Level 1
42	Oil Level 2
51	Spindle Twist Level 1
52	Spindle Twist Level 2
61	Other Level 1
62	Other Level 2

Remarks (Columns 41-42)

The instrument assigns the remarks code 75 where applicable. Classers identify other special conditions that may cause processing problems and lower yarn quality. The following remarks codes identify special condition cotton:

75	Other Side Two or More Color Grades and/or Color Groups or One Color Grade and One Color Group Higher
76	Reginned
77	Repacked
78	Redder Than Normal (Pima)
92	Pima Ginned on Saw Gin

<u>Instrument Color Code</u>	(Columns 43-44)
<u>Color Quadrant</u>	(Column 45)
<u>Color Rd</u>	(Columns 46-48)
<u>Color +b</u>	(Columns 49-51)

The instrument color determination is the official color grade for Upland cotton and is shown in columns 29-30. It is also reported here along with its color grade subdivision and its components of Rd and +b. The color measurements are in terms of grayness and yellowness. Grayness (Color Rd) indicates how light or dark the sample is, and Yellowness (Color +b) indicates how much yellow color is in the sample. The color diagram for color grades of American Upland cotton on page 11 was constructed to match the Universal color grade standards for American Upland cotton. Each color grade is subdivided to denote differences within a color grade. This information is reported as a two-digit Color Grade and a single-digit color quadrant. This three-digit number is derived by locating on the diagram the intersection of the Rd and +b readings.

The color diagram for color grades of American Pima cotton on page 13 is based on the official standards for American Pima cotton. Color grades shown in the chart are the one-digit color grades of American Pima. Two digits are shown on the classification record, the first digit being zero (0). Color Quadrants are not used for American Pima color.

Non-Lint Content (Trash Percent Area) (Columns 52-53)

The two-digit trash code reported on the classification record is the percent of the sample surface covered by trash particles as determined by image analysis. For example, a reading of 04 indicates that trash particles cover 0.4 percent of the sample surface. Trash particles include extraneous matter such as grass, bark, etc., but these particles cannot be distinguished one from another by this measurement. Therefore, the classer will continue to designate samples containing extraneous matter particles.

Length Uniformity Index (Percent) (Columns 57-59)

Length uniformity index is a three-digit number that is a measure of the degree of uniformity of the fibers in a sample to the nearest tenth (the decimal is not displayed). The descriptive terms listed below may be helpful in explaining the measurement results.

Descriptive Designation	Length Uniformity
Very Low	Below 76.5
Low	76.5 – 79.4
Average	79.5 – 82.4
High	82.5 – 85.4
Very High	Above 85.4

Upland or Pima (Column 60)

This one-digit code indicates whether the sample is Upland or American Pima.

- 1 = Upland
- 2 = Pima

Record Type (Column 61)

This one-digit code indicates the type of record, as follows:

- 0 = Original
- 1 = Review
- 2 = Rework

Record Status (Column 62)

This one-digit code indicates whether or not the manual classing information has been corrected:

0 = Not a correction

1 = Correction

CCC Loan Premiums and Discounts (Columns 63-67)

This five-digit code gives the CCC loan premium and discount points for Upland cotton. The physical loan price for Pima cotton is shown in cents per pound.

Upland – Column 63 (+) if Premium, (-) if Discount

Columns 63-67 will be left blank if the bale is not eligible for loan.

Module/Trailer Averaging Fact Sheet

Background

The Cotton Program first offered Module/Trailer Averaging to the cotton industry in 1991 as a means to improve the accuracy of instrument strength readings. The success of this 1991 pilot project resulted in increased industry participation and the expansion of Module/Trailer Averaging to include additional instrument measurements for the 1992 and 1993 crops. Beginning with the 1994 crop, Module/Trailer Averaging included only the quality factors of mike, strength, length, and length uniformity. Results from this project show conclusively that Module/Trailer Averaging significantly improves the laboratory-to-laboratory reproducibility of instrument measurements. The Cotton Program continues to offer Module/Trailer Averaging to the cotton industry on a voluntary basis for the measurements of micronaire, strength, length, and length uniformity. Listed below are some important facts regarding Module/Trailer Averaging:

Participation			
Crop Year	Number of Gins	Number of Bales Module/Trailer Averaged	Percent of Bales Classed by USDA
1991	99	1.2 million	8
1992	212	2.2 million	15
1993	242	3.1 million	20
1994	304	4.8 million	24
1995	251	3.8 million	22
1996	230	3.8 million	21
1997	198	3.6 million	20
1998	179	2.4 million	18
1999	174	3.1 million	19
2000	188	3.4 million	20
2001	186	3.7 million	19
2002	184	3.4 million	20
2003	210	4.1 million	23
2004	200	5.2 million	24

Reproducibility (Five Year Production 2000-2004)			
Instrument Measurement	Reproducibility of Individual Test vs. Quality Assurance	Reproducibility of Module/Trailer Averaging vs. QA	Percent Reproducibility Improvement Achieved By Using Module/Trailer Averaging
Micronaire	82	87	6.0
Strength	76	89	17.1
Length	81	92	13.5
Length Uniformity Index	87	96	10.3

Reproducibility Tolerances		
Quality Factor	Tolerance (+ or -)	
	2003 & Previous	2004 & Later
Micronaire	0.1	.15
Strength	1.5	1.5
Length	0.02	.025
Length Uniformity Index	1.0	1.5

Module/Trailer Averaging

In keeping with a majority of recommendations received from the industry, Module/Trailer Averaging includes the instrument measurements for micronaire, strength, length, and length uniformity. Instrument color and trash are not averaged.

Studies of module average data accumulated since 1991 showed conclusively in 2002 that outliers consistently tended to move back to the module average within acceptable testing tolerances when re-tested. Therefore, starting with the 2002 cotton crop, the module averages of fiber quality were assigned to outlier bales unless such bales were the first or last bale of the module or when the number of outlier bales in a module exceeded 20 percent of the total number of bales. This practice was thoroughly discussed in cotton industry meetings during the following year and ultimately received the support of the cotton industry in early 2004. First and last bales of the module which have values measuring outside the three-standard deviation range (and bales outside the range when there are more than twenty percent of the total number of bales in the module) have been reported as outliers since the 2002 crop, and as before, outlier measurements are not used in determining the module average. Outlier bales are assigned their own individual instrument readings. The table below shows the range of measurements that are accepted in the module/trailer average:

Measurement	Permitted Range Beginning With The 2003 Crop
Length	0.04 inches
Strength	3.00 gm/tex
Micronaire	0.30 units
Length Uniformity Index	2.00 percent

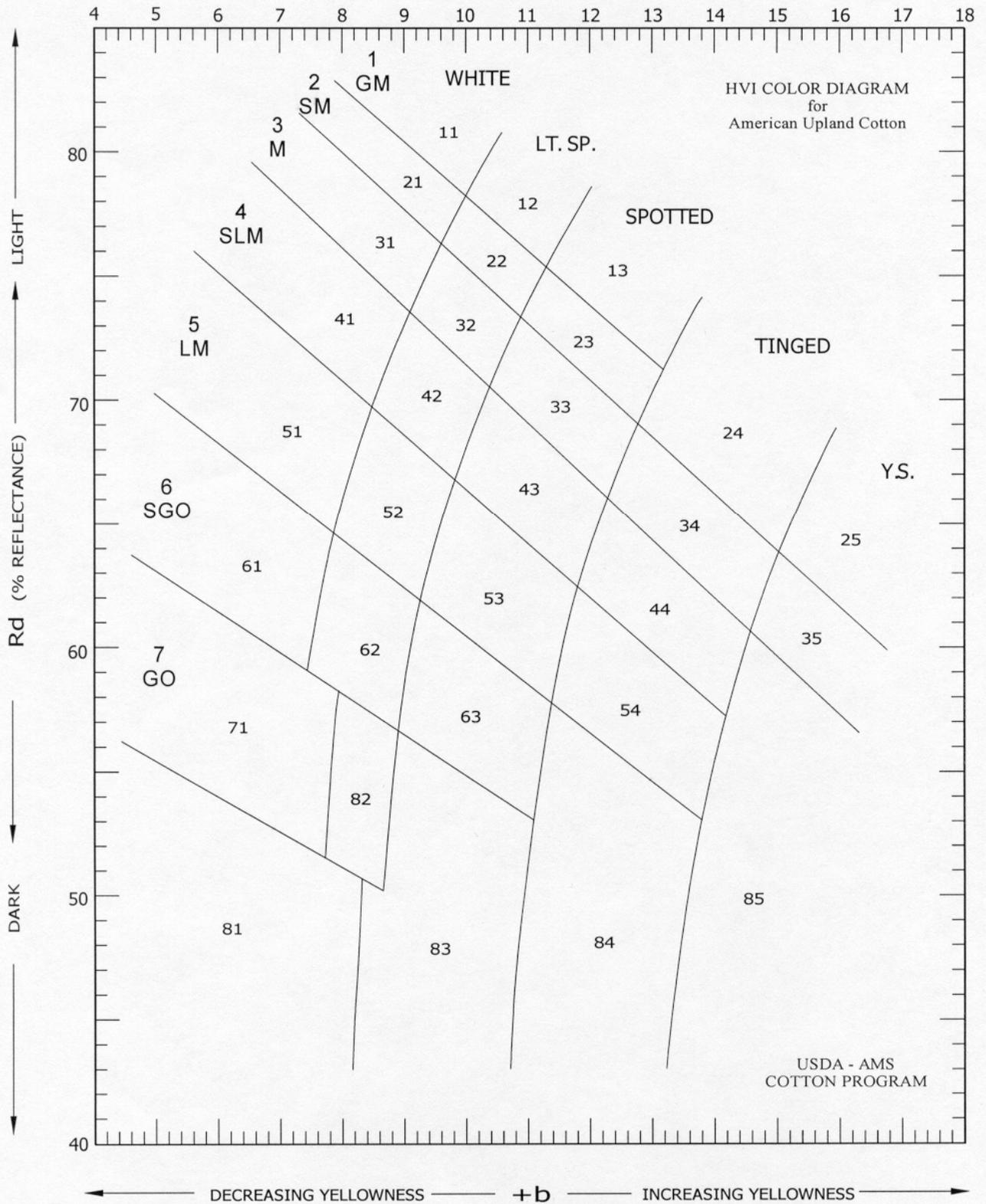
The classer-assigned quality factors - leaf grade and extraneous matter (if any) - are not averaged, and each bale stands on its own for these factors.

Review classification for individual bales in a module or trailer is permitted for the official color grade, classer leaf grade, classer extraneous matter, instrument color, and instrument trash. All of these preceding quality factors are reviewed, but the review classification retains the original module/trailer averages for micronaire, strength, length, and length uniformity index.

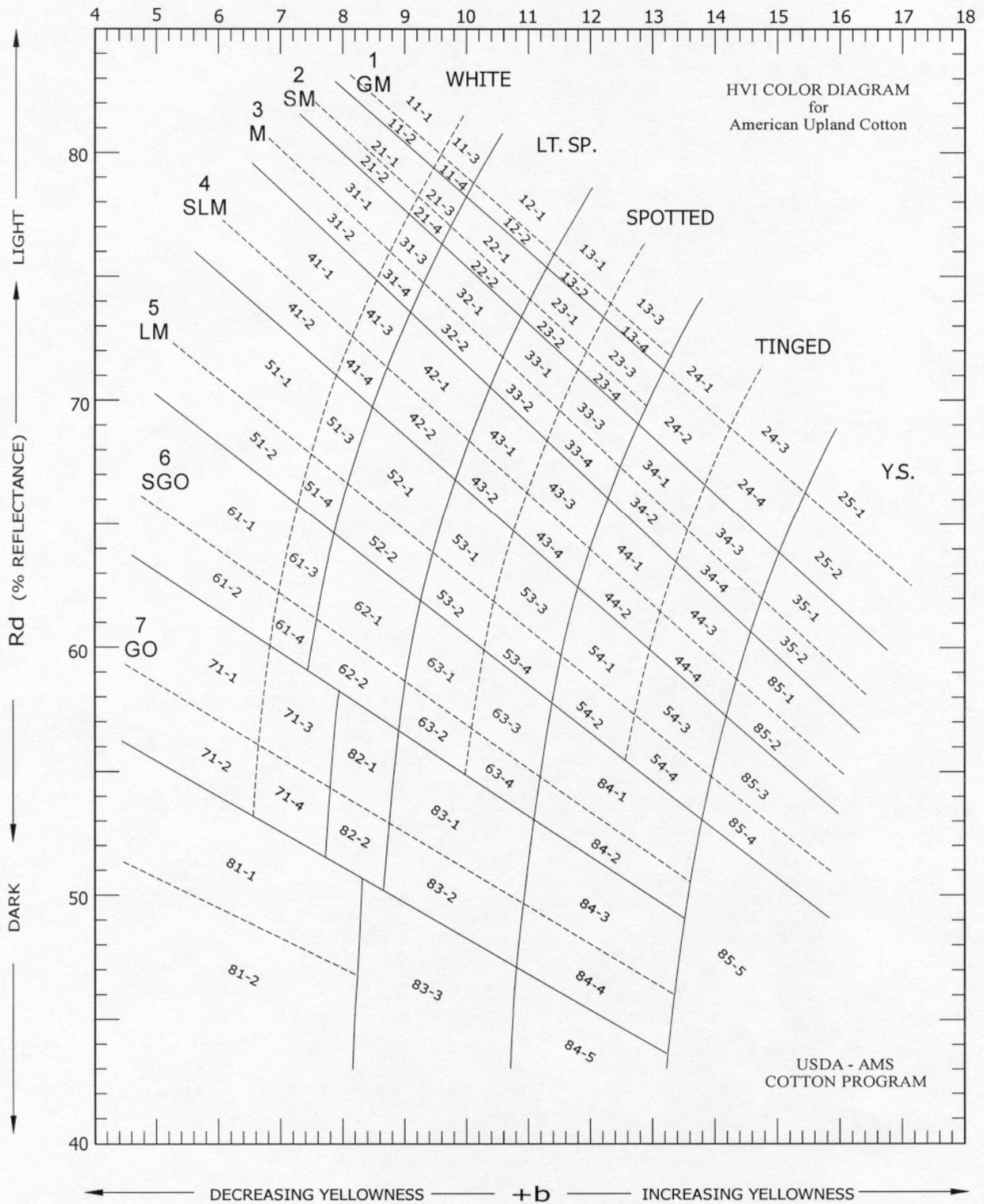
If a review classification is desired for the module/trailer averaged factors of micronaire, strength, length, and length uniformity index, samples from all bales (excluding outliers) in the module or trailer must be submitted together for review classification. All quality factors including classer-assigned values will then be reviewed.

If a review classification is desired for outlier bales, all quality factors are reviewed.

OFFICIAL COLOR GRADES FOR AMERICAN UPLAND COTTON



HVI COLOR GRADES FOR AMERICAN UPLAND COTTON



HVI COLOR GRADES FOR AMERICAN PIMA COTTON

